October 1998

To Whom It May Concern,

The Paint Technology Center received panels treated with several corrosion inhibitors with a request to evaluate for possible application to Civil Works structures. The materials were evaluated in a laboratory immersion environment for an extended time period. After exposure the coatings performance was evaluated. The attached Memorandum to Files reflects that work.

If there are any further questions please contact me at 217.373.7237.

AL BEITELMAN
Director, Paint Technology Center

1. Panel Preparation.

The Surtreat Corporation, 5535 Hobart Street, Pittsburgh, PA, ph: 412-421-4735 requested testing and evaluation of four types of corrosion inhibitors, Surtreat GPHP, Surtreat Transeal B, Surtreat GPHP-K, and Surtreat VC, June 1997. Wet samples were not received from the Surtreat corporation, so ½" x 4" x 6" panels were supplied to the Surtreat company for corrosion inhibitor application. Upon receipt of completed panels, a Corps vinyl system, V-766e, was applied. Dry film thickness (DFT) of coated panels was 7.66 mils. Surface profile measurements were taken in accordance with ASTM D4417 Method C (Replica Tape).

Panel No.	Surface Prep. (mils)	Corrosion Inhibitor	V-766e DFT (mils)	Comments
3321	SSPC-SP5 profile= 1-1.5	None- Control	7.58	Edges have some light rust.
3322	water oxidized	None	8.13	Medium-Medium dense red rust on both sides of panel. Color transfers to white cloth towel. Surface preparation normally not considered acceptable for immersion coatings.
3323	water oxidized	GPHP	8.85	Panel was equal to 3322. Rust is now bound up with clear product having no apparent thickness. Rust appears heavier on rear than front of panel.
3324	SSPC-SP5	GPHP	8.38	Panel was equal to 3321. A bluish tint is now apparent on the surface of the panel.
3325	SSPC-SP5	Transeal B	6.98	Panel is equal to 3324. Panel has a slightly darker blue tint. Streaks are apparent on the face of panel indicating locations of corrosion inhibitor sagging.
3326	SSPC-SP5	GPHP-K	7.65	Panel is equal to 3321. Panel has a light stain mark trailing down edges and from drilled hole.
3327	water oxidized	GPHP-K	6.80	Panel is equal to 3322. A whitish appearance is apparent , obscuring the rust on the front. The rear does not exhibit this degree of rusting that the front does.
3328	SSPC-SP5	VC	7.03	Panel is equal to 3321.

After a 48-hour drying period at standard laboratory ambient conditions, the panels were immersed in cold (75^0 F) aerated tape water. The panels will remain in test until a failure is noted. Signs of failure include: color variations, blisters, poor adhesion, peeling or flaking of the coating, any difference in texture, presence of chalking, and any other abnormal surface films.

2. Observations.

The panels were removed from test on 19 Feb 1998. Test panels were evaluated in accordance with ASTM D714, Evaluating Degree of Blistering of Paints.

Panel No.	Corrosion Inhibitor	Comments
3321	None- Control	1- #6 at score
3322	None	GOOD
3323	GPHP	Few- #3 Blisters
3324	GPHP	Few- #3 Blisters
3325	Transeal B	Few- #3 Blisters
3326	GPHP-K	Few- #3 Blisters at edges
3327	GPHP-K	Few- #3 Blisters at edges
3328	VC	GOOD

At the request of Surtreat, panels were again evaluated on 21 AUG 1998. Adhesion was evaluated in accordance with the adhesion test for V-766e vinyl type paints detailed in CWGS-09940, Painting: Hydraulic Structures. This test entails a 7 mil paint film be dried vertically for 18 hours, and immersed in warm (85-90 deg. F) tap water for 48 hours. Immediately upon removal, a pocketknife will be used to make two parallel cuts at least 1 inch long approximately ¼ inch apart. A third cut will be made perpendicular to and passing through the end of the first two cuts. Using the tip of the knife, the film will be loosened from the panel. The adhesion is acceptable is the strip of paint breaks when pulled or if the strip elongates a minimum of 10% during its removal.

Panel No.	Corrosion Inhibitor	Adhesion	Comments
3321	None- Control	Excellent	1- #6 at score, Few #8 blisters
3322	None	Excellent	No change. Slight rusting noted at score.
3323	GPHP	Poor	Few- #3 Blisters at score, Substrate rusting is evident
3324	GPHP	Poor	Med.- #8 blisters located at top portion of score, and round patch on bottom right front of panel, and lower half of rear of panel. No evidence of underfilm corrosion.
3325	Transeal B	Extremely Poor	Dense- #8 blisters at score, 3- 1" blisters on front, 1- 1" blister on back, 2- ½" blisters on back bottom of panel
3326	GPHP-K	Good-excellent	Few- #6 at edges and below score, Few- #4 blisters on back
3327	GPHP-K	Fair-good	Few- #3 at edges, and bottom of backside. Coating at bottom of panel exhibits "dryness" and is starting to crack and disbond from substrate. Coating seems unusually brittle
3328	VC	Good	Few- #8 blisters present on score. Underfilm corrosion is present.

3. Conclusions:

The typical Army Corps of Engineers applications for high performance coatings involves immersion in water. We have found that vinyl systems offer optimum performance. For this reason, the testing of the Surtreat products included the application of high performance vinyl paint systems. It was found that blistering was more likely to occur when vinyl coatings were applied over corrosion inhibited steel. The problem was observed to some extent with all inhibitors tested.

This laboratory considers our existing standards for steel cleanliness to offer the best performance for vinyl paints for continuous immersion service.